Concept Paper

Cost Engineering in the U.S. Department of Energy

For the
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Preface

The National Energy Technology Laboratory (NETL) Center for Acquisition and Business Excellence (CABE) met with the Department Of Energy's Office of Engineering and Construction Management (OECM) on February 8, 2001. It was determined that the CABE would produce a Concept Paper to support the work being managed by OECM and NETL with respect to cost and schedule estimation and cost engineering.

This Concept Paper will address:

- What is Cost Estimating?
- How are Cost Estimates used?
- What are Internal and External Requirements?
- What are Internal and External Guidance / Standards for Performing Cost Estimates?
- What is the World Doing in Cost Engineering ?
- What are Activity-Based Cost (ABC) Estimates?
- How Should Cost Estimates be Handled?
- What are Acceptable "Forms/Fits/Functions" of Cost Estimates?
- History of Cost Estimating in the DOE
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I. Introduction to Cost Estimation and Cost Engineering

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A. Objectives
B. Distinctions Between Cost Estimating and Cost Engineering

This concept paper will summarize ideas and terminology found both within the DOE and outside of the DOE (other federal agencies, commercial practice, and industry standards). In doing so, this paper supports the direction the DOE is taking to establish the DOE-Cost Engineering Group (CEG), to establish policy and procedures regarding cost engineering, and to outline the Cost Estimate Quality Improvement Initiative.

According to the Bureau of Labor Statistics, there are approximately 211,000 individuals employed as Cost Estimators and Cost Engineers among various industries and specific professions within the United States. Within the DOE, there are ten people registered with membership in Association for the Advancement of Cost Engineering, International (AACEI), with and without certifications. Among the DOE contractors, there may be up to, or exceeding, several hundred individuals directly and indirectly associated with DOE projects. Many maintain certification as Cost Engineers, Cost Consultants, or Professional Estimators.

> *"Accurately forecasting the cost of future projects is vital to the survival of any business. "*
>
> Bureau of Labor Statistics, Occupational Outlook Handbook (1)

Cost estimation[1] is the determination of quantity and the predicting, or forecasting, within a defined scope of the costs required to construct and equip a facility, to manufacture goods, or to furnish a service. Included in these costs are assessments and an evaluation of risks and uncertainties.

Hence, *cost estimates*[2] are determined utilizing experience and calculating and forecasting the future cost of resources, methods, and management within a scheduled time frame. Cost estimates provide input to original baselines and changes to baselines, against which cost comparisons are made throughout the life of a project. The estimate may be in the form of proposals submitted by contractors / Government agencies, a response to a program opportunity notice, or an official DOE estimate. Cost estimates and cost estimation provide a basis for feasibility studies, business planning, budget preparation, and cost and schedule control. Unique characteristics of a cost estimate include:

[1] "AACEI Standard Cost Engineering Terminology." *AACE Recommended Practices and Standards. 1990, rev. 11/91.*
[2] "AACE Standard Cost Engineering Terminology." *AACE Recommended Practices and Standards*, 1990. Rev. 11/91.

- Representation of a specific Scope of Work (SOW)
- Representation of a specific schedule
- Specific basis of the estimate, and representation of the best available information at a point in time
- Formation based around a Work Breakdown Structure (WBS), to be consistent with the Scope of Work, the schedule, and any other pertinent aspects of a project
- Specific definitions of cost / price, which usually include direct costs (material, labor, equipment, subcontract, and any other impacting cost components), indirect costs, overhead costs, profit / fee, contingency, and escalation. These costs may be represented in a *Detailed* or *Summary* form.

Cost estimates may be proposed, given a contractual context. Cost estimates may be "bare costs" of specific activities, “what-if” scenarios, or comparisons to other similar / related work - that is, analysis. Cost estimates may be "summary" in nature, and can be a roll-up of multiple levels of details. Cost estimates are performed at a certain point in time, based on information available at the time (which should be documented as such) with given resources and time constraints. A Cost estimation package may include cost estimate details, a cost estimate summary, and a basis of estimate (which states a brief project description, and includes such details of assumptions, source(s) of information, estimation methodology(ies) employed, type(s) of cost estimates included, purpose(s) of the cost estimate, indirect / overhead explanation, escalation explanation, risk / contingency explanation or analysis, etc.).

Cost Engineering has a broader context and encompasses:

- A "point-in-time” cost estimate
- Sources of information
- Schedule, used for determination of escalation
- Technical (project) and administrative (program) risks, for determination of contingency
- Value engineering principles, for the pursuit of a project’s best course of value
- Business management principles, for appropriate Return On Investment (ROI) and Life-Cycle Cost Analysis

The term, or function, of "cost estimating" is sometimes used synonymously with "cost engineering", though technically, they are quite different.

Typically, cost estimating is a technical, or administrative function used to document a project's anticipated costs. Cost estimates are developed as an indication of the amount expected that something (i.e. a task or activity required to

produce deliverables) *should* cost, the funds to be expended, and the resources required for a project or program. Cost estimates are also used to supply schedule information (i.e. an estimate of progress, worker productivity, or required resources) and Earned Value Management Systems (EVMS), for day-to-day project management.

In contrast, *Cost Accounting* is a look backwards; it is generally an accounting perspective, used for assurance that costs are captured into appropriate accounts (ideally for the use of historical cost information). The term "Activity-Based Costing," or ABC, is derived from the cost accounting principle which requires accounts for activities, rather than organizations or material lots.

Other related concepts include:

- *Independent Government Estimates*, which are required prior to, and for use in, analysis of contract proposals and contract modifications (also called IGE's or Independent Government Cost Estimates)
- *Value Engineering*, which requires that cost estimates be performed for various scenarios, that they be comparable to a base case to determine Net Present Value (NPV), and for the establishment of a most cost-effective alternative
- *Cost-Benefit Analysis* is also done for *Alternative Analysis*
- *Cost and Price Analysis* - for determination of contract rationality. Also known as *Should-Cost Analysis*, or *Cost Realism*
- *Budget Validation* - a review to assure budget feasibility
- *Earned Value* - uses cost estimates (Baseline and Baseline Change Information) as a basis for tracking project performance

II. Background

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A. Commercial Cost Estimating History
B. DOE Cost Estimation History
C. Volume 6 Cost Guides

Cost estimation in the private sector has literally been around forever. In recent history, it has made its way formally into mainstream business and project management, and even more recently, has become a primary driver for the budgeting process for local, state, and federal governments. It has evolved with technology, in that it currently uses some form of computer-generated *input* (manual input or Computer Assisted Design and Drafting, or CADD), *throughput* (data processing, data normalization), or *output* (reports). Cost estimating and cost engineering professional associations, which have organized around professionals with common interests, goals, and responsibilities, promote with certainty that cost estimating includes a mix of art and science. Some of these professional associations include:

- *AACE, International* - Association for the Advancement of Cost Engineering, International
- *ASPE* - American Society of Professional Estimators
- *SCEA* - Society of Cost Estimating and Analysis
- *PCEA* - Professional Construction Estimators Association of America, Inc.
- *ISPA* - International Society of Parametric Analysts

Other professional associations contend more specifically with accounting, auditing, engineering, and project management.

In the DOE, cost estimating consistency and standardization has been a recognized management issue generally since 1976, when the Office of Management and Budget (OMB) issued OMB Circular A-109, Major System Acquisition. OMB Circular A-109 (superceded by OMB A-11, Part 3, *Planning, Budgeting, and Acquisition of Capital Assets*, and more recently by OMB A-11, Part 7) established policies for the executive branch to follow in the acquisition of major systems and includes specific requirements for cost estimating and project management.

The focus of the OECM is the Capital Assets being acquired by DOE (projects), per the requirements of OMB No. A-11, Part 7, *Planning, Budgeting, Acquisition and Management of Capital Assets, dated June 2002.*

There are enough similarities between activities in construction projects and traditional operations-related projects to say that almost anything may be considered a project. Several DOE sites and programs use similar requirements and direction for all projects within the program, regardless of funding type. For instance, at some DOE sites, a "project" may be a *Privatization Project*, a *Waste Management Project*, an *Operations Project* (where the operation of a facility has been broken down into a structure where each task of operation is considered a project), or a *Reindustrialization Project* (where favorable lease arrangements are provided in return for cleanup, decommissioning, or other services). Whatever the project specifics, there are enough common aspects of cost estimates supporting those projects for inclusion. For now, this paper will focus on generic "projects", without regard to specific program requirements, which should follow and be consistent with DOE policies, orders, and implementation guidance.

Along with management reform in the federal government, there seems to be initiative to become more commercially-oriented, more financially accountable, and less bureaucratic. This is what swung the pendulum from the prescriptive DOE Orders 4700.1 and 5700.2d to the less-prescriptive DOE Order 430.1 (Life- Cycle Asset Management, or LCAM). However, in doing so, the DOE gave up some of its ideals of consistency and standardization, and had become more vulnerable to audits and reviews. The OECM and the DOE Order 413.3, have evolved from recommendations of several reports, which include findings of shortcomings in the Project Management areas within the DOE, which includes cost estimation.

History of DOE Cost Engineering, the CCMD, and the Volume 6 Cost Guide

- *Early 1980's* - the DOE established the Committee for Cost Methods Development (CCMD), which was to serve as a focal point for cost estimating- related issues and was initiated to improve cost estimation quality. This ad- hoc, voluntary organization was initiated by Management and Administration (MA) at the DOE Headquarters, and later by Field Management (FM) and Field Integration (FI).
- *1980's* – The DOE issued DOE Order 5700.2 Cost Estimating, Analysis, and Standardization. (The latest revision in 1992, DOE O 5700.2d was cancelled with the implementation of LCAM in 1995.)
- *1982* – The DOE published the Six Volumes of MA-0063. MA-0063 referenced DOE Orders 4700.1 - Project Management, 5700.2D - Cost Estimating Analysis and Standardization, and others.
- *November 1994* - Volume 6 - Cost Estimating Methods and Techniques became the current standard for the DOE estimations. Contains consolidated parts of MA-0063. This remains in the directives system as DOE G 430.1-1 Cost Estimating, commonly referred to as the Volume 6 Cost Guide.

- *August 1995* – The DOE issued Order 430.1 Life-Cycle Asset Management (LCAM). Older DOE Orders (4700.1, 5700.2d, 6430.1a, etc.) were to be phased out with its implementation.
- *April 1996* - Charter meeting of the Applied Cost Engineering (ACE) Team, Albuquerque, NM. The ACE Team began as an EM-40 (formerly Environmental Restoration) initiative, but has since become a recognized function of EM and EM-6.
- *March 1997* - Volume 6 Cost Guide was issued as draft DOE G 430.1.1 in the DOE directives system (no revision to 1994 version; still refers to “old” DOE Orders)
- *July 1997* - Joint Partnership Agreement between the DOE and AACEI to promote "Total Cost Management".
- *May 1999* - CCMD Meeting (combined with ACE Team Meeting) in Chicago. An action item addressed the need to revise the Volume 6 Cost Guide.
- *October 1999* - OECM began.
- *2000* - OECM signed an MOA with the NETL/CABE to provide the DOE with cost estimation and cost engineering expertise.
- *2002***-** DOE established the DOE Cost Engineering Group (DOE-CEG).

The DOE has also made progress through the review and development of the Volume 6 Cost Guide. This brings about the past experiences in the DOE regarding cost estimating and cost engineering into the present guidelines that have been established.

Evolution of the Volume 6 Cost Guide

6 Volumes of DOE/MA-0063 included:

- *Volume 1* - Economic Analysis: Methods, Procedures, Life Cycle Costing, and Cost Reviewing/ Validating
- *Volume 2* - Standard Procedures for Determining Revenue Requirements (Product Cost)
- *Volume 3* - Cost Factors: Capital and Operations and Maintenance Factors of Representative Energy Systems and Facilities
- *Volume 4* - Cost Data and Cost Estimating Relationships (CERS): Process Equipment, Bulk Materials, Facilities and Packaged Units
- *Volume 5* - How to Construct and Use Economic Escalation Indices
- *Volume 6* - Cost Estimating Methods and Techniques

The current DOE G 430.1-1 Cost Estimating (a.k.a. Volume 6 Cost Guide) seems to consolidate information from all 6 Volumes, and includes chapters on:

- *Volume 1* - Economic Analysis, Life Cycle Costing, and Cost Reviewing / Validating
- *Volume 4* - Cost Estimating Relationships (CERS)
- *Volume 5* - Escalation
- *Volume 6* - Cost Estimating Methods and Techniques

The Volume 6 Cost Guide does *not* include information from:

- *Volume 2* - Standard Procedures for Determining Revenue Requirements (Product Cost)
- *Volume 3* - Cost Factors: Capital and Operations and Maintenance Factors of Representative Energy Systems and Facilities

III. Requirements

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A. Federal Government
B. Department Of Energy
C. Industry Standards
D. Other Related Requirements (Activity-Based Costing, Life-Cycle Costing, and Scheduling)
E. Summarized Proposed Requirements for DOE's Cost Estimation and Cost Engineering - Including the Need for Institutionalized Standards (mixed ideologies dealing with ABC, LCC, use of parametric cost estimation, escalation, and contingency)

There are numerous requirements in the federal government, which reference cost estimation, either directly or indirectly. Primary drivers include OMB Circular A-11, Part 3, which is explicit in requiring "Risk-Adjusted Cost Estimates" for capital projects, which are the focus of OECM.

The Federal Acquisition Regulation (FAR) makes specific requirements for cost estimates, especially in terms of government estimates. Depending on the context of a project or contract, a government estimate may be performed by other (non-proponent) contractors for the government, although a *Government Estimate*, by definition, should represent the government's views of a contract's costs and schedule. From these requirements, it may be derived that the DOE personnel may perform and review project cost estimates, to assure compliance with the DOE orders and project directives. There is specific Congressional language requiring the use of External (non-proponent) Independent Reviews, or EIRs, including a review of project cost estimates and schedules.

10-CFR-436 makes reference to cost estimates as a requirement in consideration of alternative power. There are also public laws that indirectly affect cost estimating, such as:

- *FFMIA*- Federal Financial Management Integrity Act
- *FASA*- Federal Acquisition Streamlining Act
- *CFO Act*- Chief Financial Officer Act
- *GPRA*- Government Performance and Results Act
- *GMRA*- Government Management Reform Act
- *ITMRA*- Information Technology Management Reform Act

Within the DOE, the directives system contains requirements based on the missions of the DOE and the requirements passed onto the DOE program lines.

Various DOE Orders include requirements for cost estimates, including the DOE orders regarding Budget Formulation, Contracting, and Project Management.

In implementing the Federal and the DOE requirements, the DOE Field Offices and Program Offices may have more direct and specific requirements based on contract types and local conditions.

The cost estimating, cost engineering, and project management professional associations determine within their memberships what practices are appropriate for recommendation as standards. Some of these professional associations, as also mentioned in Section 2, include:

- *AACE, International* - Association for the Advancement of Cost Engineering, International
- *SCEA* - Society of Cost Estimating and Analysis
- *PCEA* - Professional Construction Estimators Association of America, Inc.
- *ASPE* - American Society of Professional Estimators
- *ISPA* - International Society of Parametric Analysts
- *SAVE* - Society of American Value Engineers
- *PMI* - Project Management Institute

One of the more widely- used industry standards in cost estimation and cost engineering is the AACEI Cost Estimate Classification System, Recommended Standard 17-R97. This standard generally describes cost estimates relative to the project level of definition, where "5" represents the least defined and "1" represents the most defined. Degrees of accuracy and other parameters of cost estimates may be associated with these levels of definition. This standard seemed to coincide with the appropriate guidelines and pertinent parameters for the DOE to adopt as a Cost Estimate Classification System.

A summary of the current hierarchy of cost estimation requirements for work being managed by the DOE is as follows:

- *Federal Requirements* for cost estimates, which include the Federal Acquisition Regulations, or FAR (for contract actions), Office of Management and Budget (for budget submission and capital asset acquisition, also known as OMB), and 10-CFR-436 (in consideration for alternative power).
- *DOE Requirements* follow policies, orders, and implementation guides through the directives system. The directives system currently includes topical requirements such as budget formulation, contract administration, and project management.

- *DOE Field Office Requirements* include more specific requirements for cost estimation, which depend on the prime contract type, scope, and technical aspects of the contract. Also, resources within the DOE field and site offices are a factor in determining at what level the DOE manages, oversees, or understands the details of cost estimating processes and systems.

  A summary of requirements for DOE project cost estimates:

- Cost estimates and Life-Cycle Cost Analysis should be performed at decision points within programs/projects (DOE O 413.3). The DOE O 413.3, requires "baselines" and "baseline ranges" to be performed to support various critical decisions.
- Cost estimates should be performed to support budget requests (DOE, FAR, and OMB Circulars).
- Cost estimates should be performed to support contract actions (DOE, FAR, and OMB Circulars).

In the private sector, cost estimates are used as a normal part of business management. In most cases, cost estimates (or sales prices) are specifically based on historical information, are institutionalized, and are systematically produced, or automated. In other situations, costs and prices are negotiated on a case-by-case basis, which may have limitations on documentation. Construction firms in the business of competitive fixed-price industries are most notable for predicting what costs will be, since the bottom line is typically fixed. In such a competitive industry, there is little, or no room, for error.

Also within the private sector, competitive manufacturing and retail sales have regulations, but rely on past business practices and culture to establish going market prices. In the utility business, some prices are regulated by law, and budgets for services are established by reverse costing; this means that an amount is approved, and the company is held liable to make that budget work. In the private sector, whether pertaining to the cost of an item being sold or the price of a contract, the primary motivation for cost efficiency is profit. Since the government is not-for-profit, there are some differences; contractors utilized by the DOE are not necessarily driven in the private sector by profit.

Generally, the DOE is no different from the private sector in that, there are required cost estimates for supporting budget decisions, contract actions, and other day-to-day project management decisions. Although products are “not-for-profit”, contractors are managed with competition and are driven by that respective competitive marketplace. There are many aspects involved with cost estimation and cost engineering, and all these aspects are common among the DOE projects.

In the Department of Defense (DOD), cost estimating and cost engineering is specialized. The CAIG (Cost Analysis Improvement Group) maintains procedures for cost analyses supporting project milestones. They also maintain standards for the DOD.

Within federal agencies, there are both similar and different requirements, due to varying issues in stipulations that are dependent upon the independent offices. The DOE may be closely aligned with the U.S. Department of Defense (DOD), simply due to the relatively large size and complexity of the projects and programs, with similar contracting and budget issues. Many parts of the DOD have also had recent issues with consistency and standardization, similar to the DOE.

From the summarized requirements, primarily referencing DOE Order 413.3, and the Critical Decision (CD) Process, the following may be established as primary and secondary purposes of cost estimation:

Primary Functions

- To Support the Critical Decision Process (also includes Life-Cycle Cost Analysis)
- Preparedness for Phase Advancement

The following are basic Levels of Review Status:

CD-0 Mission Need (Order of Magnitude, AACE Class 5)
CD-1 Preliminary Baseline (Budgetary, AACE Class 3)
CD-2 Performance Baseline Approval / Construction Start (Definitive, AACE Class 1)

Secondary Functions

- Budget Submissions (also for Change Control)
- Procurement Actions (also for Change Control)
- Project Management

It may be necessary to standardize the formats to assure fulfillment in the instance that there are more detailed requirements. Although, generally, all cost estimates should be centered on a Work Breakdown Structure and Code of Accounts (WBS, COA, respectively). Cost estimates should be activity-based to the most practical extent. Life-Cycle Cost estimates should be established in a baseline scenario for planning purposes, and for any alternatives being explored. Normally, schedules should be directly correlated to a cost estimate and the WBS/ COA.

IV. Policy

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A. Applicable DOE Orders
B. Site Issues
C. Contract Issues

Prior to its cancellation, the DOE O- 5700.2d was a source of policy regarding cost estimating, analysis, and standardization.

It was the DOE Policy that:

a. Cost estimates be developed and maintained throughout the life of each project.
b. Guidelines for developing project estimates must be maintained by all DOE field offices in accord with procedures outlined in this Order.
c. Independent cost estimates and independent cost analyses be conducted outside of proponent organizations in support of acquisition executive key decisions, or in response to requests or recommendations by program / project management and control (PR-20).
d. Project estimates and budget requirements shall include identifiable prevision for price changes due to economic inflation or deflation predicted in accord with guidance issued by PR-24 or other procedures as outlines in this Order.

Some of these requirements are still in practice, although there is a lack of consistency and standardization among the respective DOE sites and program offices. There is also a lack of discipline in documentation and trace-ability.

In establishing a "Policy" regarding cost estimating, it should be reinforced that cost estimating is a function and responsibility of the DOE. Due to the status of project management within the DOE, it seems pertinent to emphasize cost estimation quality, as a policy, which possesses a broad and diverse implied application. Among them is assuring feasibility for contracting purposes, for budget purposes (i.e. Environmental Liabilities audits, etc.), and for day-to-day project management purposes.

In re-establishing a Cost Estimating Policy, it should be acknowledged that each of the DOE sites have specific requirements regarding implementation of such policies. Also, the DOE field offices have varying levels of capabilities when implementing a DOE Policy or a DOE Order. Flexibility for the field offices and programs is essential.

With the implementation of a policy, it should also be acknowledged that every contract is different. Since most of the DOE's work is contracted through major Management and Operations and Integration contractors (M&O's and M&I's,

respectively), a Cost Estimation Policy would need to be incorporated through a clause, to be added to each contract on a case-by-case basis. Each contract would then evaluate impact and assess the budget and resources for implementation.

Most of the DOE contracts have formal project management/ project controls organizations already in place. Baselines have been established, and changes are managed via a formal change-control process. It seems that infrastructure to support this Cost Estimating Policy may already be in place. The vital part possibly viewed as deficient is quality assurance within the cost estimating process. Therefore, a Cost Estimating Policy, or a new DOE Cost Estimating Order, would have minor budget impacts.

The consistent use of the Cost Estimate Review Criteria should enhance the systematic process of developing and documenting credible cost estimates. These reviews should reach a conclusion of "Reasonableness", which is necessary for contract actions and budget submissions.

V. Procedures

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A. Cost Estimating Requirements
B. Life-Cycle Processes
C. Cost Estimating Processes
D. Cost Estimate Quality
E. Quality Reviews

Current DOE Guidelines for cost estimating have been in existence since the 1980's. The current Cost Estimating Guide is DOE G 430.1-1. In the last Committee for Cost Methods Development (CCMD) meeting, held in Chicago in May 1998, it was determined that DOE's Cost Estimating Guide needed to be revised.

The industry utilizes many different techniques regarding cost estimating. Each company may have different definitions of direct and indirect costs, different contract types and estimates, used for different purposes.

Estimating requirements, as derived from Federal and DOE Requirements, should: 1. be more specifically stated to support decisions within programs/projects, including the Critical Decision Process, and be coordinated with design progress; 2. cost estimates should be done to support Budget Requests (DOE Orders/FAR/OMB Circulars) ; and 3. cost estimates should be done to support Contract Actions (DOE Orders/FAR).

Processes should be more specifically defined and structured for the use of cost estimators, program/project managers, and other Government and contractor organizations. There are four processes involved when utilizing a Life-Cycle Process model: Information Gathering, Cost Estimate Preparation, Internal Reviews, and lastly, External Reviews.

A Life-Cycle Process, in layman's terms can mean where a project / program, contract, or budget stands in its life-cycle. There are primary estimates (e.g. Critical Decision Process) and secondary estimates, which include contract, budget, and project management requirements. Primary estimates are used to support the Critical Decision Process (also includes the Life-Cycle Cost Analysis), the mission need (rough order of magnitude), baseline approval (budgetary), and construction start (definitive). Secondary cost estimates are used to support other requirements, budget submissions and procurement actions (those not included in the Critical Decision Process), sound project management, check estimates, Internal Reviews, and also to support External Reviews.

Life-Cycle Process

- LCC Analysis to be performed at decision points within projects and programs
- LCC estimates to be submitted with cost and funding information for proposed projects
- LCC = TPC + Ownership Costs (includes operations, maintenance, and support through disposition) - Revenues (per GPG-32A - Life-Cycle Costs)

Cost estimation *quality* should be appropriate for the Life-Cycle Phase and should be documented to provide consistency and standardization considering its: type, purpose, methodology (ies), and contract type.

There are certain processes and procedures related to cost estimating and cost engineering within the DOE. Each is responsible for detailing criteria and encompassing project goals as a whole.

Cost Estimating Processes

- **Process 1** - Information Gathering
  - Determine Estimate or Internal / External Review
  - Background
  - Previous Estimates / Reviews
  - Purpose
  - Type (Classification System)
  - Contract Types

- **Process 2** - Estimate Preparation
  - Specific to Cost Estimate Type and Purpose (Classification)
  - Graded Approach (Commensurate to Project Size and Complexity)
    - Methodology
    - Content
    - Schedule
    - Checklists
  - Walk-downs
  - Quantity Take-off
  - Systems Such as CSI, ECES (Formerly HTRW)
  - Formats (Budget Submission, Contract Actions, etc.)

- **Process 3** - Internal Reviews

- 1st Line of Quality
- Consistency and Standardization
- 90% of the Work by DOE Project Managers and Cost Estimators
- Internal to a Field Element, Program Office, Site or Contractor with Fiscal Responsibility
- Review Criteria
- May be Objective and Subjective Reviews - Anything Goes (Bottom Line is Credibility and an Estimates' "Sell-Ability")
- "Reasonableness" is Necessary for Contract Actions and Budget Submissions
- May Include Input from "Independent 3rd Party"

- **Process 4** - External Reviews
  - External to a Site or Program Office
  - "Independent 3rd Party"
  - Responsible for reporting to Field Management (FM), Inspector General (IG), General Accounting Office (GAO), Congress, etc.
  - Field Offices are Responsible for Cooperating, and May be Responsible for Coordinating, but not for Conducting
  - a.k.a. Independent Reviews
  - Independent Cost Estimates (ICEs)
  - Independent Project Assessments

There are 2 types of "quality" reviews:

- ***Objective Reviews*** (formal, structured, Checklist Reviews):
  - Volume 6 Cost Guide
  - Project Validation Analysis Checklist
  - Other cost estimating guides and references
  - Industry Standards (Common Sense Initiative or CSI, and Environmental Cost Elements Structure or ECES)
  - Project- Specific Technical Scope
  - Cost Estimator- Specific

- ***Subjective Reviews*** (informal, less-structured)
  - Management Reviews
  - May cover topical Areas, but not do not address technical aspects or details

VI. Compliance

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A. Cost Estimate Review Criteria
B. Cost Estimate Quality

Every cost and schedule estimate in cost engineering or cost estimating should be held to specific standards aligned with the goals and procedures of the specific project or program. Estimates are set by activities and scopes of work, but should adhere to quality standards to ensure consistency and standardization, across the program or DOE site. The following criteria were recommended by CCMD in 1996, and should be more firmly established as minimum requirements by the DOE.

Cost Estimate Review Criteria

At a minimum, cost estimate packages should be reviewed for:

1. Escalation. Provision in a cost estimate for increases in the cost of equipment, material, labor, etc. due to continuing price changes over time. Escalation is used to estimate the future cost of a project or to bring historical costs to the present. Consideration of escalation is most appropriate for long- term projects, most order of magnitude, and some budgetary estimate types. Escalation is less appropriate for nearer term projects, some budgetary and most definitive estimate types. (i.e. Cost Estimates for BCP's in a current FY may not require the use of escalation.)

2. Contingency. Amount included in an estimate to cover costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties. Contingency should also be commensurate with *risk* - a factor, element, constraint, or course of action on a project that introduces an uncertainty of outcome and the possibility of technical deficiencies, inadequate performance, schedule delays, or cost overruns that could impact a Departmental mission. In the evaluation of *project risk*, the potential impact and the probability of occurrence must be considered.

Contingency is most significant and appropriate for long-term projects, most order of magnitude and budgetary estimate types, whose size and complexity are significant. Contingency is less significant and less appropriate for nearer term projects whose size and complexity are less significant. The use of contingency should help portray a high degree of confidence in successful project completion.

3. Indirect and Overhead Rates. Indirect rates should be defined for consistent application and be appropriate for a given project. Overhead rates should also be defined and appropriately applied.

4. Qualified Cost Estimators. Cost estimates should be performed and documented by professionals trained in the use of cost estimating tools, methodology, and all aspects of estimating, project control, and project management.

5. Work Breakdown Structure. Should be consistent between the technical definition, the cost estimate, and the schedule. The use of a common WBS should be considered for consistency between projects within a program WBS.

6. Scope of Work / Level of Planning. Should be commensurate with the phase of planning, project size, and complexity and should be activity based to the extent practical.

7. Level of Effort. Should be traceable to a scope of work and should be commensurate with the phase of planning, project size, and complexity.

8. Methodology. Should be appropriate based on estimate type, purpose, available technical information, time constraints, and possess parallel commensurate with the phase of *planning*, project size, and complexity. The chosen methodologies should facilitate systematic cost estimate duplication or verification.

9. Cost Estimation Documentation. Should be traceable and consistent. As a matter of *great* relative importance, cost estimate documentation should be very thorough (i.e. provided to the furthest extent possible). In most cases, documentation should be specific for a given project (or sub-project), mentioned in a Basis of Estimate, and should be centrally maintained to assure technical / cost / schedule adherence, management focus, and ease of reference.

10. Cost Estimate Updates. Should be appropriate to reflect new information, given a project's phase of planning and/or execution.

11. Life-Cycle Costs. Normally, life-cycle cost estimates are most pertinent during decision-making phases of a project's life, when life cycle cost analyses (comparison of life cycle cost estimates, similar to Value Engineering Studies) are performed, but should be considered throughout a project's life.
Life Cycle Costs should include: start-up costs; operating Costs; manufacturing costs; machining costs; research and development costs; engineering, design, and inspection costs; decommissioning costs; and direct costs, indirect costs, overheads, fee, contingency, and escalation.

Cost Estimate Quality should be appropriated for its Life-Cycle Phase and be documented to provide consistency and standardization, assure reasonableness, and enhance reliability.

- Purposes - Primary (i.e. Critical Decisions)
- Types (AACEI CE Classifications 5 - ROM, to 1 - Definitive)
- Methodologies (Parametric, Detailed (Bottoms-Up), Analogy, etc.)
- Contract Types (Fixed Price, Cost Plus Incentives Fee, etc.)

*Why Emphasize Cost Estimate **QUALITY**?*

- May be measured objectively, for Performance-Based Contracting
- May be measured objectively, for Performance-Based Budgeting
- May be used as an indicator of "Reasonableness", which is required by contracting principles and budget validations
- Cost Estimate Reviews - Documentation of expected outcomes (for cost estimates)

> *"Providing reasonable estimates based on reliable data is critical in order to ensure effective program stewardship and accountability."*
>
> General Accounting Office, January 1999

VII. Conclusions

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A. Current Situation
B. Near / Long-term Planning

Currently, the DOE has recognized issues regarding cost estimation consistency and standardization (ref FY 1998 "Qualified Financial Statement"). These issues have occurred among the DOE projects and programs, field offices, and contracts.

In the near-term:

- Draft a DOE Cost Engineering Policy
- Draft a DOE Cost Engineering Order
- Create DOE-CEG - similar to the DOD CAIG - with a charter to be established in a DOE Cost Engineering Order.
- Establish DOE standards for cost estimating and cost engineering. Also in the charter of the DOE-CEG should enhance credibility and reliability. The charter is available for review in the appendix.
- Revise DOE Cost Estimating Guide to incorporate defined and detailed Cost Estimate Requirements, Cost Estimating Processes, and Cost Estimate Quality.

In the long-term:

- Establish the DOE Policy and DOE Order for Cost Engineering
- Incorporate cost engineering requirements in the Project Management Manual (PMM). However, detailed aspects of requirements are to be included in the DOE Order for Cost Engineering.
- A formal CE Quality Improvement Program would consist of a Cost Estimate Review Reporting System, a Cost Estimating System Review Process, and a Cost Estimating Relationship (CER) Lessons Learned system.

Enhanced documented quality of our cost estimates will increase DOE cost estimating credibility.

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VIII. Appendices

Appendix A. Web Site References

ACE Team Web Site
http://www.em.doe.gov/aceteam/

FAR References
http://www.arnet.gov/far/

AACEI - Association for the Advancement of Cost Engineering, International
http://www.aacei.org/

SCEA - Society of Cost Estimating and Analysis
http://www.sceaonline.net/

PCEA - Professional Construction Estimators Association of America, Inc.
http://www.pcea.org/

ASPE - American Society of Professional Estimators
http://www.aspenational.com/

ISPA - International Society of Parametric Analysts
http://www.ispa-cost.org/

SAVE - Society of American Value Engineers (do not use link)
http://www.value-eng.com/

PMI - Project Management Institute
http://www.pmi.org/

CFOA (Chief Financial Officer Act of 1990, P.L. 101-576)

GPRA (Government Performance and Results Act of 1993, P.L. 103-62)
http://nsf.gov/od/gpra/law.htm

GMRA (Government Management Reform Act of 1994, P.L. 103-356)

FFMIA (Federal Financial Management Integrity Act of 1982 as Codified in U.S.C. 3512, P.L. 97-255)

OMB Circular No. A-11, Preparation and Submission of Budget Estimates, June 1997
http://www.whitehouse.gov/omb/circulars/a11/cpgtoc.html

OMB Circular No. A-76, Revised Supplemental Handbook, Performance of Commercial Activities, March 1996
http://www.whitehouse.gov/omb/circulars/a076/a076.html

OMB Circular No. A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, October 1992
http://www.whitehouse.gov/omb/circulars/a094/a094.html

Code of Federal Regulation, 10CFR, Part 436 “Methodology and Procedures for Life-Cycle Cost Analysis"
http://www.access.gpo.gov/nara/cfr/waisidx_01/10cfr436_01.html

Bureau of Labor Standards - Occupational Outlook Handbook, Cost Estimators, O*NET 21902 and 85305D.
http://www.bls.gov/oco/ocos006.htm

DOD Costing references
http://www.c3i.osd.mil/bpr/dodim/costweb.html

DOD Cost Analysis Improvement Group (CAIG)
http://www.dtic.mil/pae/

U.S. Army Corps of Engineers Web Site
http://www.hq.usace.army.mil/cemp/e/ec/ec_new.htm

Navy - Naval Center for Cost Analysis (NCCA)
http://www.ncca.navy.mil/

Army - Cost and Economic Analysis Center (CEAC)
http://www.asafm.army.mil/CEAC/ceac.asp

Air Force - Cost Analysis Agency (AFCAA)
http://www.saffm.hq.af.mil/afcaa/index.html

NASA - National Aeronautic and Space Administration
http://www.jsc.nasa.gov/bu2/

FRTR - Federal Remediation Technology Roundtable
http://www.frtr.gov/

EC2 - Environmental Cost Committee
http://www.environmental.usace.army.mil/ec2/

Technology Screening Matrix
http://www.frtr.gov/matrix2/

Appendix B. Cost Estimating / Cost Engineering White Paper Acronyms

1. CABE- Center for Acquisition & Business Excellence
2. OECM- Office of Engineering and Construction Management
3. ABC- Activity-Based Cost
4. CCMD- Committee for Cost Methods Development
5. FAR- Federal Acquisition Regulation
6. AACEI- Association for the Advancement of Cost Engineering, International
7. ROI- Return on Investment
8. IGE- Independent Government Estimates
9. NPV- Net Present Value
10. CADD- Computer Aided Drafting & Design
11. ASPE- American Society of Professional Estimators
12. SCEA- Society of Cost Estimating and Analysis
13. PCEA- Professional Construction Estimators Association of America, Inc.
14. ISPA- International Society of Parametric Analysts
15. OMB- Office of Management and Budget
16. LCAM- Life-Cycle Asset Management
17. LCC- Life Cycle Cost
18. CFR- Code of Federal Regulations
19. FFMIA- Federal Financial Management Improvement Act
20. FASA- Federal Acquisition Streamlining Act
21. CFO- Chief Financial Officer
22. GPRA- Government Performance and Results Act
23. GMRA- Government Management Reform Act
24. SAVE- Society of American Value Engineers
25. PMI- Project Management Institute
26. DOD- Department of Defense
27. CAIG- Cost Analysis Improvement Group
28. WBS- Work Breakdown Structure
29. COA- Courses of Action
30. FP- Force Protection
31. CPIF- Cost Plus Incentives Fee
32. GAO- General Accounting Office
33. CSI- Common Sense Initiative
34. ECES- Environmental Cost Element Structure
35. CEG- Cost Engineering Group
36. PMM- Personnel Management Manual
37. PMP- Project Management Plan
38. CE- Concurrent Engineering
39. CER- Center for Energy Research
40. ACE- Applied Cost Engineering
41. CFOA- Chief Financial Officer Act
42. FFMIA- Federal Financial Management Integrity Act

43. NCCA- Naval Center for Cost Analysis
44. CEAC- Cost and Economic Analysis Center
45. AFCAA- Air Force Cost Analysis Agency
46. FRTR- Federal Remediation Technology Roundtable
47. EC2- Environmental Cost Committee
48. HTRW- Hazardous, Toxic, Radioactive Waste
49. FM- Field Management
50. IG- Inspector General
51. ICE- Independent Cost Estimates
52. MA- Management and Administration
53. FI- Field Integration
54. ACE- Applied Cost Engineering
55. MOA- Memorandum of Agreement
56. CERS- Cost Data and Cost Estimating Relationships
57. BCP- BRAC Cleanup Plan
58. TBD- To Be Determined
59. EIR- External Independent Reviews
60. M&O- Management and Operations
61. M&I- Management and Integration

Appendix C. FAR References

FAR 36.203 Government estimate of construction costs.

(a) An independent Government estimate of construction costs shall be prepared and furnished to the contracting officer at the earliest practicable time for each proposed contract and for each contract modification anticipated to cost $100,000 or more. The contracting officer may require an estimate when the cost of required work is anticipated to be less than $100,000. The estimate shall be prepared in as much detail as though the Government were competing for award.
(b) When two-step sealed bidding is used, the independent Government estimate shall be prepared when the contract requirements are defined.
(c) Access to information concerning the Government estimate shall be limited to Government personnel whose official duties require knowledge of the estimate. An exception to this rule may be made during contract negotiations to allow the contracting officer to identify a specialized task and disclose the associated cost breakdown figures in the Government estimate, but only to the extent deemed necessary to arrive at a fair and reasonable price. The overall amount of the Government's estimate shall not be disclosed except as permitted by agency regulations.

FAR 36.204 Disclosure of the magnitude of construction projects.

Advance notices and solicitations shall state the magnitude of the requirement in terms of physical characteristics and estimated price range. In no event shall the statement of magnitude disclose the Government's estimate. Therefore, the estimated price should be described in terms of one of the following price ranges:

(a) Less than $25,000.
(b) Between $25,000 and $100,000.
(c) Between $100,000 and $250,000.
(d) Between $250,000 and $500,000.
(e) Between $500,000 and $1,000,000.
(f) Between $1,000,000 and $5,000,000.
(g) Between $5,000,000 and $10,000,000.
(h) More than $10,000,000.

FAR 36.605 Government cost estimate for architect-engineer work.

(a) An independent Government estimate of the cost of architect-engineer services shall be prepared and furnished to the contracting officer before commencing negotiations for each proposed contract or contract modification expected to

exceed $100,000. The estimate shall be prepared on the basis of a detailed analysis of the required work as though the Government were submitting a proposal.
(b) Access to information concerning the Government estimate shall be limited to Government personnel whose official duties require knowledge of the estimate. An exception to this rule may be made during contract negotiations to allow the contracting officer to identify a specialized task and disclose the associated cost breakdown figures in the Government estimate, but only to the extent deemed necessary to arrive at a fair and reasonable price. The overall amount of the Government's estimate shall not be disclosed except as permitted by agency regulations.

52.215-16 Facilities Capital Cost of Money.

As prescribed in 15.408(h), insert the following provision:
Facilities Capital Cost of Money (Oct 1997)
(a) Facilities capital cost of money will be an allowable cost under the contemplated contract, if the criteria for allow-ability in subparagraph 31.205-10(a)(2) of the Federal Acquisition Regulation are met. One of the allow-ability criteria requires the prospective contractor to propose facilities capital cost of money in its offer.
(b) If the prospective Contractor does not propose this cost, the resulting contract will include the clause Waiver of Facilities Capital Cost of Money.

Other pertinent topics within the FAR:

Part 5 - Publicizing Contract Actions

a.) Announcements of long-range acquisition estimates. 5.404-2
b.) Release of long-range acquisition estimates. 5.404

Part 11 - Describing Agency Needs

Delivery or Performance Schedules: Factors to Consider in Establishing Schedules. 11.402

Part 15 - Contracting by Negotiation

a.) Definition: Cost realism 15.401
b.) Should- Cost Review. 15.407-4
c.) Estimating Systems. 15.407-5

Part 16 - Types of Contracts

Cost Incentives. 16.402-1

Part 25 - Foreign Acquisition

a.) Determining Reasonableness of Cost. 25.105
b.) Definition: Cost of Components 25.003

Part 31 - Contract Cost Principles and Procedures

Definition: Cost Input 31.001
Definition: Cost Objective 31.001
Definition: Cost of Capital Committed to Facilities 31.001
Definition: Costs 31.205-47(a)
Definition: Estimating Costs 31.001
Determining Reasonableness 31.201-3
Cost of Money. 31.205-10
Bonding Costs. 31.205-4
Direct Costs. 31.202
Indirect Costs. 31.203
Interest and Other Financial Costs. 31.205-20
Maintenance and Repair Costs. 31.205-24
Manufacturing and Production Engineering Costs. 31.205-25
Material Costs. 31.205-26
Plant Protection Costs. 31.205-29
Plant Reconversion Costs. 31.205-31
Professional and Consultant Service Costs. 31.205-33
Public Relations and Advertising Costs. 31.205-1
Recruitment Costs. 31.205-34
Relocation Costs. 31.205-35
Rental Costs. 31.205-36
Special Tooling and Special Test Equipment Costs. 31.205-40
Training and Education Costs. 31.205-44
Transportation Costs. 31.205-45
Travel Costs. 31.205-46
Fines, Penalties, and Mischarging Costs**.** 31.205-15

Part 36 - Construction and Architect-Engineer Contracts

Government Cost Estimate for Architect-Engineer Work. 36.605

Part 47 - Transportation

a.) Transportation Cost Determinations. 47.306-1
b.) Lowest Overall Transportation Costs. 47.306-2

Part 52 - Solicitation Provisions and Contract Clauses

Definition: Cost of Components 52.225-1 52.225-3 52.225-9 52.225-11
Definition: Costs 52.216-5 52.216-6 52.216-16 52.216-17
Facilities Capital Cost of Money. 52.215-16
Waiver of Facilities Capital Cost of Money. 52.215-17
Estimate of Percentage of Recovered Material Content for EPA-Designated Products. 52.223-9
Estimated Weights or Quantities Not Guaranteed. 52.247-8
Estimated Quantities or Weights for Evaluation of Offers. 52.247-20

Appendix D. DOE Orders with reference to "Cost Estimates"

DOE Order 110.3 Conference Management
DOE Order 130.1 Budget Formulation
DOE Order 137.1A Operating in the Event of a Lapse in Appropriations
DOE Order 151.1A Comprehensive Emergency Management System
DOE Order 200.1 Information Management Program
DOE Order 224.1 Contractor Performance-Based Business Management Process
DOE Order 224.2 Auditing of Programs and Operations
DOE Order 225.1A Accident Investigations
DOE Order 231.1 Environmental, Safety, and Health Reporting
DOE Order 232.1A Occurrence Reporting and Processing of Operations Information
DOE Order 241.1A Scientific and Technical Information Management
DOE Order 251.1A Directives System
DOE Order 322.1A Pay and Leave Administration and Hours of Duty
DOE Order 331.1B Employee Performance Management System
DOE Order 350.1 Contractor Human Resource Management Programs
DOE Order 360.1A Federal Employee Training
DOE Order 361.1 Acquisition Career Development Program
DOE Order 412.1 Work Authorization System
DOE Order 413.1 Management Control Program
DOE Order 413.2A Lab Directed R&D
DOE Order 413.3 Program and Project Management for the Acquisition of Capital Assets
DOE Order 430.1A Life-Cycle Asset Management
DOE Order 430.2 In-House Energy Management
DOE Order 440.1A Worker Protection Management
DOE Order 451.1B NEPA Compliance Program
DOE Order 452.4 Security and Control of Nuclear explosives and Nuclear Weapons
DOE Order 460.2 Departmental Materials Transportation and Packaging Management
DOE Order 461.1 Packaging and Transfer or Transportation of Materials of National Security Interest
DOE Order 470.1 Safeguard and Security Program
DOE Order 472.1B Personnel Security Activities
DOE Order 481.1A Work For Others (Non-Department of Energy funded Work)
DOE Order 520.1 Office of the Chief Financial Officer
DOE Order 534.1 Accounting
DOE Order 542.1 Competitions in Contracting

DOE Order 551.1A Official Foreign Travel

Appendix E. DOE Cost Engineering Group (DOE-CEG) Charter January 2003

Background:

In recent years, reports of the General Accounting Office (GAO) and the Department's Office of Inspector General (OIG) have reported that the cost and schedule estimates, representing certain DOE projects, have been inadequate. DOE's ability to properly manage its projects is dependent on proper cost and schedule estimating practices. These practices should ensure a consistent approach to establishing these estimates, ensure that the cost and schedule estimates are reasonable, and ensure that credibility is maintained for future DOE missions.

The federal requirements to assure this reasonableness and reliability come from documents such as the Federal Acquisition Regulation (the FAR), the Office of Management and Budget (OMB), the Code of Federal Regulation (CFR), and other published industry standards. DOE also has its internal requirements, which provides specifics relative to DOE programs and projects, which must be met. "Financial Management Accountability" is a topic that is regularly tracked and published by the GAO. Also, recent reports of the NRC (National Research Council) indicate a need for improvement in DOE's ability to manage projects within established cost and schedule baselines. This NRC report led to the establishment of the Office of Engineering and Construction Management (OECM) and project management reform in the DOE.

The Office of Management, Budget and Evaluation (OMBE, DOE's Office of Chief Financial Officer), and OECM, as the DOE's project management office, has an interest in establishing standards to insure the quality of the DOE's project baselines.

In May 2002, OECM issued a DOECAST requesting support in establishment of the DOE-Cost Engineering Group (DOE-CEG). This Charter establishes the Goal and Vision, Mission, Scope, Objectives, and Approach of the DOE-CEG.

Goal and Vision:

The goal of the DOE-CEG is to improve quality of DOE's project, contract, and budget baselines, enabling managers to better control cost and schedule. The DOE-CEG will enhance program, project, and site consistency and standardization. The DOE-CEG will enable the project, budget, and contract planning processes to become more efficient and effective.

The DOE-CEG will be:

- A centralized organization within DOE to enhance Federal personnel involved in establishing Cost and Schedule Estimates.
- A credible source of information supporting DOE program and field offices in establishing cost and schedule estimates.
- A repository for DOE Standards for establishing project baselines and procedures for their management .

DOE will have necessary credibility when submitting project budgets to Congress. Audits and external reviews will show positive results and funds will be more readily available to complete program missions. DOE will essentially be more standardized and efficient.

Mission:

The mission of the DOE-CEG will be to improve DOE's cost and schedule estimating by:

1. Assuring cost estimate quality in all cost and schedule estimates performed by DOE and DOE contractors.
2. Assuring consistency and standardization in all facets of cost and schedule estimating, throughout the DOE complex.
3. Maintaining standards for cost and schedule estimating.
4. Providing input to OECM matters of policy, standards, guidance, and procedures.
5. Collecting and disseminating Lessons Learned from DOE programs, projects, and sites.
6. Maintaining information on acceptable cost and schedule estimating software and specific DOE program and field office requirements and practices.
7. Providing cost and schedule estimating and analysis capability and tools, necessary to improve every project's ability to be successful.

Scope:

The DOE-CEG encompasses all capital, facility and infrastructure projects, and information technology projects within DOE. It is envisioned that, over time, it will become better understood that "almost anything can be managed as a project." As other elements of DOE participate, the scope will expand to encompass their activities.

Objectives:

Primary Objectives:

- Provide the tools, training, and information exchange to enable higher standards of cost control and evaluation throughout the DOE
- Improve cost and schedule estimating by:

    - Assuring that DOE guidance on cost and schedule estimating is complete and current
    - Establishing standards for internal and external reviews
    - Establishing standards for collection of scope and cost data
    - Evaluating and referencing appropriate tools, such as cost and schedule estimating software
    - Facilitating scope and cost comparisons across DOE and other Federal agencies

Secondary Objectives:

- Maintain a DOE-CEG website for information dissemination.
- Develop a data base of cost information, based on historic data and on recognized, published references.
- Provide training to Project Management professionals on the use of the database as well as cost estimating principles and practices.
- Maintain a common vocabulary of terms that may be applied to cost estimating within the DOE and other Federal agencies for cost comparison purposes.
- Collaborate with professional societies, such as the Association for the Advancement of Cost Engineering, International (AACE), to assure industry standards and the utilization of the best commercial practice to a practical extent.

Approach:

1. The DOE-CEG will maintain a membership with both DOE Headquarters (including OECM, the Project Management Support Offices, and other interested organizations) and Field Personnel (including Federal and Contractor personnel).

2. The DOE-CEG will maintain the Partnership Agreement with AACE, International, to remain cognizant of industry and academia.

3. The DOE-CEG will rely on OECM for policy guidance. OECM will support all DOE-CEG activities and collaboration with other federal groups, with similar interests and issues.

4. A DOE-CEG Chairperson, represented by NETL, will ensure that:

- Applicable DOE Policy and Procedures are adhered
- Goals are set
- Milestones are completed
- Communications proceed smoothly
- Meeting agendas are established
- Meeting time, place, and teleconference numbers are coordinated
- Group communications are facilitated
- Meeting summaries are completed and distributed

5. The DOE-CEG members will provide cost and schedule estimating / Project Management interests and experiences to the DOE-CEG. The DOE-CEG will be self-empowered and promote the DOE-CEG in a positive manner that will be most beneficial to DOE and the DOE project personnel.

6. The DOE-CEG members should contribute to the goals of the DOE-CEG, to be innovative in applying techniques and concepts, to share ideas, and to freely communicate this information to co-workers and management.

7. The DOE-CEG members will:

   - Raise and resolve cost and schedule estimating issues of concern.
   - Present cost and schedule estimating information, including project accomplishments, at meetings, teleconferences, and other forums.
   - Compile and maintain a reference library of documents, reports, and other materials about cost and schedule estimating.
   - Establish the DOE-CEG as a reliable resource by disseminating information to other pertinent organizations supporting DOE program, projects, and sites.

8. DOE-CEG workshops will be held as required. Initially, annual workshops will be scheduled. Teleconferences will be held quarterly at a minimum. A facilitator may participate in each teleconference and workshop. Meeting and teleconference summaries are to be recorded and distributed to all DOE-CEG members.

9. Communication within the DOE-CEG will be uniform. Primary forms of communication will be workshops, teleconferences, e-mail, and the DOE-CEG web-site.

<u>Status of Activities:</u>

The following initial activities are proposed for the DOE-CEG:

- Maintain a DOE-CEG website, as the primary source of communication
- DOE Cost and Schedule Estimating Guide revisions
- DOE Cost and Schedule Estimating standards development
- DOE Cost and Schedule Estimating Reference Library
- DOE Cost and Schedule Estimating Software Library
- Compile historical cost data and "rules-of-thumb"
- Training opportunities and observations, primarily for DOE staff
- Maintain Cost and Schedule Estimating Lessons Learned from DOE projects

Participants:

OECM – Policy Direction
NETL – Technical Direction, Chair-persons

Members (DOE and Contractors)
DOE Project Management Support Offices
DOE Program Offices
DOE ME Offices (including Budget and Contracting)
DOE Site and Field Offices
DOE Project Offices
Other DOE Offices